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Explanation of Significant Differences:

REPUBLIC STEEL CORP. QUARRY
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EXPLANATION OF SIGNIFICANT DIFFERENCES

FOR THE
REPUBLIC STEEL QUARRY SUPERFUND SITE
ELYRIA, OHIO

The purpose of this document is to explain and justify a modification to the Record of Decision (ROD), i.e., the document embodying the selected remedy at the Republic Steel Quarry Superfund site. In brief, the change involves the addition of institutional controls and deed restrictions to the existing remedy. This necessity was recognized during the statutory Five-Year Remedy Review, at which time it was determined that institutional controls would enhance the protectiveness of the remedy. The City of Elyria, as the owner of the site, has either taken, or resolved to take, the following steps to cooperate with the United States Environmental Protection Agency (U.S.EPA) and the Ohio Environmental Protection Agency (OEPA):

Restrict the use of the property to H-I (Heavy Industrial) uses only;

Prohibit the use of groundwater as a source of drinking water;

Require the use of the City of Elyria municipal water supply as the source of potable water for any industrial or commercial development or public use;

Post warning signs to keep off the quarry site;

Maintain the repair of the perimeter fence;

Prohibit fishing, swimming and boating in the quarry

Prohibit public access or use of the quarry, its sediments and soil;

Conduct and sufficiently inspect the site to ensure that the previous controls are complied with.

For further details on the nature of this modification, please refer to Sections IV and V herein, respectively concerning the basis for the significant differences and the description of these differences.

I. Introduction

The Republic Steel Quarry (RSQ) Site is located in the City of Elyria, Lorraine County, Ohio. The Site consists of a five-acre quarry containing water and seven acres of fenced land surrounding the quarry. From 1950 to 1975, the Republic Steel Corporation discharged about 200,000 gallons per day of waste pickle liquor and rinse water consisting of sulfuric acid and dissolved metal oxides into the quarry via a ditch. In 1977, the City of Elyria purchased the

property from Republic Steel Corporation with federal funds for the purpose of turning it into a municipal park. Numerous U.S.EPA discussions with City officials indicate that they have abandoned this plan. The Site was proposed for the National Priorities List (NPL) due to the findings of heavy metals in the groundwater. The Remedial Investigation conducted between 1986 and 1988 indicated that all contamination caused by past disposal practices were limited to quarry sediments, the pickle liquor discharge ditch and several soil locations around the quarry's edge. Carcinogenic polynuclear aromatic hydrocarbons (PAHs) and heavy metals posed the greatest potential risks.

The lead agency for the remedial action at this site is the U.S. EPA. The OEPA is the support agency for the conduct of remedial activities at the Republic Steel Quarry site under the authority of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 1980 PL 96-510, 42 U.S.C. 9600, et seq., as amended, commonly known as Superfund. On September 30, 1988, the U.S. EPA, with the concurrence of OEPA, issued the Record of Decision (ROD) which outlined the remedy selection process and the selected cleanup plan for this site. The Site has been remediated and is currently in the Operation and Maintenance (O&M) phase. Because certain contaminants remained at the site post-remediation, a Level II Five-Year Review was completed in September 1998 to reevaluate site risks. The Review revealed the presence of risks which could be effectively mitigated by the inclusion of institutional controls as a component of the current and future O&M activities at the site. In addition, the institutional controls component will facilitate the deletion of the Site from the NPL. This document provides a discussion of significant changes to the manner in which the selected remedy will be carried out from this time forward.

II. Requirement to Address Significant Changes

As the lead agency, the U.S. EPA may determine that a significant change to the selected remedy, as described in the ROD, is necessary after the ROD is signed. Section 117 (c) of CERCLA requires that after adoption of a remedial action plan, as described in a ROD:

- (1) if any remedial action is taken,
- (2) if any enforcement action under Section 106 is taken, or
- (3) if any settlement or consent decrees under Section 106 or Section 122 is entered into, and if such action, settlement, or decree differs in any significant respects from the final plan, the lead agency shall publish an Explanation of Significant Differences (ESD) and the reasons such changes were made. (42 U.S.C. 9617(c))

The U.S. EPA, in consultation with the OEPA, has determined that significant changes should be made to the manner in which the remedial action plan, as described in the ROD, is carried out. These necessary changes are discussed further in Section IV.

The ESD will become part of the Administrative Record file. This record is located in both the

seventh-floor Records Center at U.S. EPA offices at 77 West Jackson Boulevard, Chicago, Illinois and at the information repository. The Administrative Record available locally for this Site is located at the Elyria Public Library, 320 Washington Avenue, Elyria, Ohio. The opportunity to review this and other site records is available during normal business hours.

III. Background

A. Site History

The RSQ Site is located in the City of Elyria, Ohio, which is southwest of Cleveland in Lorain County. The site consists of a four-acre quarry containing water and seven acres of fenced land surrounding the quarry. Water depth of the quarry is approximately 60 feet and the sides of the quarry rise to about 25 feet above the quarry water surface (see Figures1and 2).

The RSQ Site was operated as a sandstone quarry during an unknown period of time prior to 1950. From 1950 to 1975, the Republic Steel Corporation discharged about 200,000 gallons per day of waste pickle liquor and rinse water from pickling operations to the quarry. Waste pickle liquor, consisting largely of sulfuric acid and dissolved metal oxides, was pumped through an aboveground pipe to a ditch which flows into the quarry. Republic Steel Corporation was later acquired by LTV Steel Corporation, who is presently operating the steel plant south of the quarry. In 1976, the discharge ditch leading to the quarry was dammed. The City of Elyria purchased the quarry and the seven surrounding acres of land from Republic Steel Corporation in 1977, with the intention of establishing a municipal park on the property in the future. The site was proposed for the National Priorities List (NPL) due to the findings of heavy metals in the groundwater. Both the City of Elyria and LTV Steel Corporation challenged the site's eventual placement on the NPL which was finalized in 1986. A court upheld the listing in 1990.

B. Remedial Investigation Results

Through a Fund-lead cleanup, U.S.EPA streamlined the remedy selection process and remedial action (RA) activities. The Remedial Investigation (RI) conducted between 1986 and 1988 indicated that all contamination caused by Republic Steel's disposal practices were limited to quarry sediments, the pickle liquor discharge ditch and several soil locations around the quarry's edge (see Fig. 3). Health risks posed by the major site contaminants, carcinogenic polynuclear aromatic hydrocarbons (PAHs) and heavy metals, arose from several current and future exposure pathways. Both the quarry and the Black River, which borders the site on the east, are used for recreational purposes such as swimming and fishing. Drinking water is currently supplied to surrounding residents via the Elyria municipal water supply system. If the site were not remediated under the current conditions, fish caught and consumed on a regular basis from the quarry would pose an unacceptable risk. In addition, future exposure scenarios indicated that residential contact with site soils and consumption of groundwater would also pose unacceptable health risks. A Feasibility Study (FS) typically succeeds the RI and is conducted to determine the best approach to cleaning up a site using nine specific criteria, including but not limited to:

protectiveness, short and long- term effectiveness, cost and permanence. An FS was not conducted for this site because the contaminants exceeding action levels in the soils were limited in volume and distribution to specific areas or hotspots. The contaminated sediments were confined to the quarry bottom and not easily accessed by humans, except via fish consumption. In addition, the groundwater was not being used as a potable water source.

C. Summary of ROD Provisions

The ROD prescribed the excavation and removal of 100 cubic yards of combined sediment and soils exceeding an Action Level of 300 ppb for carcinogenic PAHs from the drainage ditch and hotspots around the edge of the quarry. The quarry and the surrounding land were to be fenced. Further, the ROD specified that a fish species survey and fish tissue bioassay, as well as groundwater resampling, be conducted during a supplemental investigation so that risks could be recalculated using actual fish tissue data and more recent groundwater data. Since groundwater was not used as a potable water supply, the ROD did not call for groundwater treatment. The contaminated quarry sediments were to be left in place since they were below the mixing zone and fish were not likely to come in contact with these contaminants. U.S. EPA also concluded that quarry remediation measures would likely entrain contaminated sediments in the water, thereby increasing the likelihood of exposure to contaminants by fish and thus increased risk to humans consuming the fish. Since signing the ROD, the U.S. EPA and the OEPA have determined that although the ROD remains protective, it is necessary to make changes in the conduct of the remedy with regard to institutional control measures at the site. These changes are discussed in Sections IV and V.

D. Remediation

The Remedial Action (RA) was completed by U.S. EPA in 1990 and was implemented in two phases, the first phase involved a determination of the requirements for the future fish/biota species survey and fish tissue bioassays, and additional groundwater monitoring. The second phase involved addressing the contaminated soil and sediments. Obtaining data related to the first phase was critical because the modeled results of the RI baseline risk assessment indicated an unacceptable noncarcinogenic risk to humans consuming contaminated fish tissue. This risk needed to be validated using fish tissue bioassays.

Regarding additional groundwater monitoring needs, during the time period following the RI baseline risk assessment, beryllium and bis(2-ethylhexyl)phthalate toxicity had been reassessed by U.S.EPA and reassigned higher cancer potency factors, thereby increasing the carcinogenic risk estimates to humans exposed to contaminated groundwater via ingestion.

The risks to human receptors from both fish consumption and groundwater ingestion were recalculated and documented in the *Republic Steel Quarry Elyria, Ohio Final Supplemental Report for the Republic Steel Quarry Site, September 26, 1990.* This Report confirmed that no unacceptable risks were present to humans consuming fish from the quarry and Black River;

hence, U.S. EPA did not recommend to the Ohio Department of Health that a fish advisory be issued. Because the groundwater was not being used as a potable water source, there was no imminent risk presented to human health from groundwater consumption.

U.S. EPA performed the second phase of the RA for soil and sediments, when the potentially responsible parties declined to perform the cleanup. A total of 150 cubic yards of material were ultimately excavated and disposed of offsite to meet the RA cleanup goal for carcinogenic PAHs.

IV. Basis For Change

Because contaminants at concentrations above health-based levels remained in the deep quarry sediments, a statutory Level II Five-Year Review was conducted in 1997 and included sampling of all site media. The findings of the Five-Year Review provide the basis for recommending significant changes to the ROD. The results of the Site investigation indicated that while the Site has no formal use, trespassing is well-established. The Five-Year Review risk recalculation indicated that no unacceptable on-site or off-site risks were posed to casual trespassers; however, regular use of the quarry via swimming or fish consumption presented unacceptable risks. The fence would normally limit such exposure, however it was breached in many places rendering it ineffective.

Under future residential use, the groundwater consumption and soil ingestion pathways each posed unacceptable risks. Future park patrons (children) would be at risk from soil ingestion. Further, groundwater must not be made available as a potable water source since this would present a risk to any and all users.

The recommendations of the Five-Year Review for limiting or preventing such exposures included: restoring the fence to functional condition, posting warning signs, and conducting monthly inspections of the fence, with increased vigilance in warm weather, to detect and repair vandalism to the fence and signs. The Review further recommended that groundwater monitoring be performed during future Five-Year Reviews until the Site can be deleted from the NPL. U.S. EPA recommended that the City enact land use restrictions so that no residential development could occur and the use of groundwater for potable water would be prohibited for current and future commercial/ industrial or public use. Use restrictions were necessary since soil data from the Level II investigation indicated that carcinogenic PAHs exceeded the original Action Level of 300 ppb in several areas of the Site, which are currently enclosed by the fence.

The City of Elyria indicated a willingness to cooperate with U.S. EPA's request to implement zoning and groundwater use restrictions by passing an emergency Resolution of Intent (Resolution No. R99-31) on November 1, 1999 to prohibit certain uses of the site as a result of the Five-Year Review findings. The Resolution states that the City will make all reasonable efforts to: restrict the Site to heavy industrial use; prohibit the use of groundwater as a source of drinking water; require the use of the City of Elyria municipal water supply as the source of potable water for any industrial or commercial development or public use; maintain Site security

and warning signs; prohibit public access and recreational use of the quarry; and, conduct inspections to ensure that these land use and access controls are complied with.

V. Discussion of the Significant Differences

A. Current ROD Provisions

The three major elements of the remedy selected and documented by the1988 ROD are discussed below. Each of these elements was further evaluated during the Five-Year Review investigation. This ESD addresses the appropriate corrective measures needed at the Site to ensure protection of human health and the environment.

1. Excavation of contaminated soils exceeding the 300 ppb Action Level for carcinogenic PAHs.

These contaminants included benzo(a)anthracene, chrysene, benzo(b)fluoranthene and benzo(k)fluoranthene. The affected areas involved soils from the pickle liquor discharge drainage ditch and in the boat launch area at the southern edge of the quarry. The ROD estimated the excavation would involve 100 cubic yards; however, about 150 cubic yards were ultimately excavated. The soils were to be disposed of offsite according to RCRA regulations. Although not specified in the ROD, the quarry and the surrounding land were to be fenced.

Resampling of soil in 1997 during the Five-Year Review investigation indicated that soil samples from the boat ramp areas along the south shore of the quarry did not contain any organic contaminants exceeding the cleanup goals. Copper was the only site-related contaminant whose concentration significantly exceeded background levels. In the pickle liquor drainage ditch area, two of the four carcinogenic PAHs (benzo(a)anthracene and chrysene) upon which cleanup goals were based, exceeded the 300 ppb level at three sampling locations (see Fig. 2). These sampling locations were inside the existing fence at collective depths ranging from 0-8 inches.

Soil exposure risks for adults and children were evaluated for the current time using a trespasser scenario, and for in the future using both the recreational park patron and residential scenarios. The risk recalculation determined that there is currently no unacceptable on-site or offsite risk to casual trespassers; however, under future residential use the soil ingestion pathway poses unacceptable risk. Under future recreational park patron use, children would be at risk from soil ingestion. This information supports the fact that while the site has no formal use at this time, casual trespassing does occur, and would not be expected to present a risk from the soil exposure pathways alone. Potential risks under the future use scenarios, however, indicate that access to the site, as well as restricted use of the site must be formally observed.

2. Conduct of a fish species survey and fish tissue bioassay during a

supplemental investigation.

Due to time constraints at the time of the Remedial Action, the fish tissue levels were estimated using a conservative sediment to fish tissue model and quarry sediment data collected during the RI, in lieu of performing actual fish tissue bioassays. The quarry itself was not identified for remediation as U.S. EPA concluded that such measures would likely entrain contaminated sediments in the water, thereby increasing the likelihood of exposure to contaminants by fish and by those humans consuming quarry fish or swimming in quarry water.

During the Five-Year Review investigation, the quarry sediments were found to contain various classes of compounds - - inorganics and metals, volatile organics and semi-volatile organics, including carcinogenic PAHs. Humans are most likely to come in contact with these contaminated sediments via the uptake of these contaminants by fish tissue. Hence, the fish tissue pathway was an important element of the risk assessment. Fishing is known to occur in the quarry and adjacent Black River. Exposure via ingestion of fish was considered for the current adult trespasser, future park patron (adult and child) and future resident (adult and child). Resampling of the fish tissue during the Five-Year Review indicated that regular fish consumption and swimming in the quarry could pose unacceptable risks. Therefore it is important that access to the quarry itself be restricted. Aside from the hazard due to chemical contaminants in the quarry and its sediments, the quarry presents numerous physical hazards owing to the sheer 25-ft walls which rise above the quarry surface and the 60-foot water depth within the quarry.

3. Resampling of groundwater during subsequent investigations.

Since groundwater was not used as a potable water supply, the ROD did not call for groundwater treatment. The RI sampling (August 1987) indicated that methylene chloride and acetone were present in groundwater, however a second sampling (March 1988) did not confirm the presence of these chemicals. These chemicals were assumed to be present for the purposes of producing a protective baseline risk assessment. The conflicting results however, necessitated a third sampling event (October 1988) which failed to detect these chemicals. The Supplemental Report (September 1990) recalculated the risks from groundwater using the semi-volatile and organic contaminants previously identified from the RI, but not the two unconfirmed chemicals, methylene chloride and acetone. The potential human health risks presented by contaminated groundwater would be addressed if adequate assurances are put in place that all potable water will be supplied by the Elyria municipal water supply. There are currently no users of groundwater onsite or within at least one-half mile of the site.

The Five-Year Review investigation resampled groundwater. Although no acetone or methylene chloride were found, another common laboratory contaminant, bis(2-ethylhexyl)phthalate was found in addition to numerous inorganic contaminants such as arsenic, antimony, beryllium, manganese and thallium. The risk recalculation considered future residential exposure to groundwater as a potable water source for both adults and children. Consumption of groundwater

under this scenario presents unacceptable risks for adult and child receptors.

B. Additional ROD Provisions

The three provisions of the ROD highlighted above, while effective in removing most of the site-related accessible contaminants, have not been fully effective at protecting human health from the contaminants that remain on-site. Risks to human health still exist should regular trespassing or recreational use of the quarry occur at this time. In addition, residential use of the property which assumes exposure to contaminated groundwater and soils would present unacceptable risks. This finding is well-documented in the Level II Five-Year Review Report (September 1998).

This ESD requires the addition of a fourth component to the remedy, institutional controls and deed restrictions, which will actively prevent human and environmental contact with the site and will enhance the remedy's protectiveness of human health and the environment. The City of Elyria owns the property and maintains the fence surrounding the quarry. Since institutional controls or deed restrictions were not part of the remedy at the time of the ROD, U.S. EPA has discussed with the City of Elyria, the need to maintain security provisions to prevent trespassing and recreational use of the Site; and the need to implement institutional controls and deed restrictions to prevent current and future groundwater use at the Site.

The U.S. EPA has determined as per this ESD Document, that the following provisions should be incorporated into the institutional controls and deed restrictions for the Republic Steel Quarry Site:

1. Any future use of the Site must be restricted to heavy industrial use. This indicates that residential use of the property, as well as public access or recreational use of the quarry, its sediments and soil must be prohibited.

2. The use of groundwater as a source of drinking water must be prohibited and the use of the City of Elyria municipal water supply as the potable water source for any industrial or commercial development or public use must be required.

3. The City of Elyria must continue to post and maintain Site security and warning signs, as well as maintain the repair of the quarry perimeter fence. Further, the City must conduct sufficient inspections to ensure that any land use and access controls they may adopt in the future are complied with.

Should trespassing or recreational use of the property occur in the future on an infrequent basis, no significant risks would be anticipated since groundwater is not accessible as a potable water source. However, if residential use of the property occurred, the cancer and noncancer risks would be unacceptable by at least three orders of magnitude due largely to the groundwater contamination.

VI. Affirmation of the Statutory Determination

Considering the new information that has been developed pursuant to the Five-Year Review, and the changes which may be required in the selected remedy, the U.S. EPA and the OEPA believe that this ESD enhances the protectiveness of human health and the environment, complies with state and federal requirements that are legally applicable or relevant and appropriate to this Remedial Action, and does not impact the cost-effectiveness of the original remedy.

VII. Support Agency Statement

The OEPA as the support agency, has had an opportunity to review this ESD. The OEPA is in agreement with the modification proposed to the Remedial Action, as described in this ESD.

VIII. Public Participation Activities

The ESD will be added to the Administrative Record for the Republic Steel Quarry Site. U.S. EPA and OEPA will prepare a Fact Sheet type summary of this ESD for distribution to those persons already on the Republic Steel Quarry site mailing list, and other interested parties. The Fact Sheet will note that if members of the public would like to discuss site issues pertaining to this ESD at greater length, they should contact the staff members noted in that document.

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William E. Muno, Director Date
Superfund Division

Figure 1 - Site Map

Figure 2 - Site Map of three Soil Contaminated areas